

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF WASTE, AIR AND RADIATION MANAGEMENT
BUREAU OF RADIATION PROTECTION
HARRISBURG, PA 17101

March 1, 2010

BRP INFORMATION NOTICE 2010-01 MEDICAL EVENTS FROM RADIATION EXPOSURE DURING
THE USE OF COMPUTED TOMOGRAPHY, FLUOROSCOPY,
AND MEDICAL ACCELERATOR TELETHERAPY

ADDRESSEES

All medical facilities performing high-dose diagnostic and/or therapeutic procedures within Pennsylvania and regulated by the Department of Environmental Protection (DEP), Bureau of Radiation Protection (BRP).

PURPOSE

This notice is to alert medical facilities of the potential radiological hazards and "medical event" reporting requirements associated with certain patient radiation exposures that may result from unnecessary, inappropriate, or improperly calibrated medical diagnostic or therapeutic X-ray or accelerator procedures and devices.

DESCRIPTION OF CIRCUMSTANCES

In the spring of 2009, the National Council on Radiation Protection and Measurements (NCRP) Report No. 160 revealed that the U.S. population's average individual exposure to ionizing radiation from medical procedures grew by nearly sixfold between the mid-1980s and 2006. The increase is largely attributed to dramatic growth in the use of computed tomography (CT). Other high-dose procedures, such as fluoroscopic cardiovascular and other interventional procedures, all added to the increase in patient exposure and respective increase in average medical dose in the population. More recently, the media coverage of medical events occurring with diagnostic and therapeutic X-ray procedures performed around the country has warranted an Information Notice to alert the medical field of the importance of establishing proper patient protocols and attention to patient radiation protection throughout all phases of a medical procedure. These medical events include: cases of acute skin damage of patients who have undergone prolonged fluoroscopy, CT brain perfusion studies of stroke victims causing loss of hair, and undetected errors in radiation therapy treatments causing severe acute radiation effects or patient death. These reported radiation-related medical events are rare and regretful occurrences that have resulted in tragic consequences for the patients involved. Of equal concern is the rise in medical radiation exposure with diagnostic X-ray exams (e.g., CT), and the potential for increased long-term health effects such as cancer.

DISCUSSION

No diagnostic or therapeutic X-ray procedure can be administered without some potential risk. In most cases, such diagnostic X-ray exams enable doctors to evaluate the patient without invasive and possibly life-threatening surgical procedures. The philosophy of radiation protection implies that before a person is exposed to ionizing radiation, one should justify the procedure by weighing the benefit to the patient, with the potential risk associated with the radiation dose, and perhaps cumulative dose from multiple X-ray exams. The DEP recommends adherence to the American College of Radiology (ACR) and others guidelines in reducing and optimizing medical diagnostic radiation exposure, referrals for X-ray exams, and therefore, providing the best standard of care to the patient. With therapeutic high energy X-ray procedures, one is trying to cure a cancer and other diseases or administer palliative treatment to relieve pain. The goal is to deliver a very high radiation dose to the target tissue volume, but spare the healthy surrounding tissues and organs. Again, DEP recommends adherence to the American Society for Radiation Oncology (ASTRO) and others guidelines in the radiation therapy planning, quality control (QC), and delivery.

RECOMMENDATIONS

The BRP also recommends that each medical facility performing conventional radiographic X-ray, CT, fluoroscopic, and/or accelerator procedures promptly do the following:

1. Re-evaluate calibrations, techniques, protocols, and radiation output of all X-ray and radiation therapy devices to ensure optimum performance in patient use.
2. Determine proper protocols are developed and adhered to for X-ray exams and individual patient profiles, i.e., size, thickness, patient's age, etc.
3. Ensure educational training programs for all medical staff include specific courses and information on equipment quality assurance and patient radiation protection.
4. "Child-size" CT techniques and "Step Lightly" with interventional radiology (IR) delivered to your pediatric patients! More information may be found at the Image Gently Web site, <http://www.imagegently.org/>.
5. Review the ASTRO six-point patient protection plan aimed at improving radiation therapy safety, QC, and reducing the chance of medical events. See - www.astro.org.
6. Submit all Medical Reportable Event notifications to DEP/BRP in a timely manner per regulation (see attached DEP Fact Sheet).
7. Allow only physicians credentialed with an appropriate medical specialty board to perform CT and fluoroscopy procedures. Continuing education in patient radiation safety, image recording, biological effects, quality assurance and control is a regulatory requirement for all X-ray operators.

While unnecessary radiation exposure must be avoided, well planned and implemented medically needed radiation therapy and diagnostic X-ray procedures have benefits that far outweigh any radiation risks. Patients should always be informed on all aspects of their medical care, and discuss with their doctor any concerns they may have if receiving diagnostic or therapy X-ray procedures. The recently publicized, but very rare, medical events with tragic consequences serve as a poignant reminder that all medical procedures are not without risk. We highly recommend that medical staff remain vigilant and committed to identifying and implementing improvements in X-ray equipment and procedures that may reduce patient (diagnostic) radiation exposure, while enabling continued high-quality, safe, and effective medical care.

CONTACT

This IN requires no specific action or written response. Please direct any questions about this matter to the technical contact listed below.

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Attachment: Fact Sheet on Medical Reportable Events and Other Medical Reports
for Radiation-Producing Machines (Used for Therapy or Diagnosis)